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<b>For: Apparatus and Method for Transmitting a</b>	:	
<b>Television Signal Received in a Mobile</b>	:	
<b>Communication Terminal</b>	:	
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**SUBMISSION OF CERTIFIED ENGLISH TRANSLATION OF PRIORITY**  
**DOCUMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

The Applicants submit herewith a certified English translation of Korean Patent Application No. 2003-25383, as filed at the Korean Intellectual Property Office on April 22, 2005. Should anything further be required, the Office is asked to contact the undersigned at the telephone number indicated below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Simon G. Booth".

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## **CERTIFICATE OF TRANSLATION**

As a below named translator, I hereby declare that my residence and citizenship are as stated below next to my name and I hereby certify that I am conversant with both the English and Korean languages and the document enclosed herewith is a true English translation of the invention disclosure with respect to the Korean patent application No. 2003-25383 filed on April 22, 2003.

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*Translation of Priority Document*

**THE KOREAN INTELLECTUAL  
PROPERTY OFFICE**

This is to certify that annexed hereto is a true copy from the records of the Korean Intellectual Property Office of the following application as filed.

Application Number: Korean Patent Application No. 2003-25383

Date of Application: April 22, 2003

Applicant(s): Samsung Electronics Co., Ltd.

**COMMISSIONER**

**[ABSTRACT OF DISCLOSURE]**

Disclosed is an apparatus for transmitting a signal of a moving image in a mobile communication terminal capable of reproducing the moving image. The apparatus comprises: an input section for generating signals for capturing and  
5 transmitting a moving image signal which is being reproduced; a control section for generating, according to the signals of the input section, a command signal for capture and transmission of the moving image signal which is being reproduced, the control section controlling the moving image signal to be displayed and simultaneously the displayed image to be captured and transmitted; a memory for storing the image  
10 captured according to a capture command of the control section; and a transmission section for transmitting the captured image stored in the memory.

**[REPRESENTATIVE FIGURE] FIGURE 7**

15 \*Description Concerning Reference Numerals of the Drawings\*

television signal; mobile communication terminal ; display; capture; transmit

**[SPECIFICATION]**

**[TITLE OF THE INVENTION]**

**APPARATUS AND METHOD FOR TRANSMITTING TELEVISION SIGNAL  
RECEIVED IN MOBILE COMMUNICATION TERMINAL**

**5 [BRIEF DESCRIPTION OF THE DRAWINGS]**

FIG. 1 is a block diagram illustrating a construction of a mobile communication terminal transmitting a television signal according to an embodiment of the present invention;

FIG. 2 is a detailed block diagram illustrating a connection between elements  
10 for receiving a television signal and a control section shown in FIG. 1;

FIG. 3 is a detailed block diagram illustrating the construction of an image processing section shown in FIGs. 1 and 2;

FIG. 4 is a timing view illustrating operation characteristics of the control section and the image processing section shown in FIGs. 2 and 3;

15 FIG. 5 is a view illustrating a display area of a television image signal in a display section shown in FIG. 1;

FIG. 6 is a view illustrating the constructions of a keypad and the display section shown in FIG. 1;

FIG. 7 is a flowchart for explaining a transmission process of a television signal  
20 according to an embodiment of the present invention;

FIG. 8 is a view illustrating the states of the display section when a still image is transmitted according to a first embodiment of the present invention;

FIG. 9 is a view illustrating the states of the display section when a moving image is transmitted according to a second embodiment of the present invention; and

25 FIG. 10 is a view illustrating a menu serviced under a television reception mode in FIG. 7.

**[DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT]**

**[OBJECT OF THE INVENTION]**

**30 [RELATED FIELD AND PRIOR ART OF THE INVENTION]**

The present invention relates to a transmission apparatus and method employed in a mobile communication terminal, and more particularly to a transmission apparatus and

method employed in a mobile communication terminal which has a function of receiving a television signal.

At present, mobile communication terminals have been developed to have a  
5 function capable of transmitting high-speed data in addition to a voice communication function. That is, when a mobile communication network according to the International Mobile Telecommunication-200 (IMT-200) standard is realized, a high-speed data communication can be realized in addition to a voice communication by the mobile communication terminal. A mobile communication terminal performing the  
10 data communication can process packet data and image data (for example, picture data and pixel data).

Also, the mobile communication terminal comprises a display section having a size which shows a tendency to gradually increase. Also, mobile communication terminals have appeared on the market, which are capable of displaying image data  
15 received from a base station or capable of processing data photographed by a camera. The above-mentioned mobile communication terminal can receive and display a television image. In this case, the mobile communication terminal must further have a television signal reception function. Also, it is required that such a mobile communication terminal can perform a communication function either simultaneously  
20 while processing television signals or independently to the processing of television signals.

Therefore, methods for receiving and reproducing a television signal (that is, operation in a television mode) simultaneously while performing a voice communication or a data communication (that is, operation in a communication mode)  
25 have been proposed.

However, while the conventional mobile communication terminals reproduce a moving image, they can be used only in communication but cannot be used in other work such as editing according to users' tastes. That is, in the conventional mobile communication terminals, other necessary works can be performed only after the  
30 reproduction of the moving image, and functions for such works are now being added one by one.

Therefore, a mobile terminal capable of performing other desired functions

simultaneously while reproducing a moving image is highly required.

**[SUBSTANTIAL MATTER OF THE INVENTION]**

Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is  
5 to provide an apparatus and method for transmitting a received television signal in a mobile communication terminal having a function of receiving the television signal.

Also, another object of the present invention is to provide an apparatus and method for capturing and transmitting a received television signal in a mobile communication terminal having a function of receiving the television signal.

10 Also, still another object of the present invention is to provide an apparatus and method for capturing and transmitting a moving image signal which is being reproduced in a mobile communication terminal having a function of reproducing the moving image.

Also, still another object of the present invention is to provide an apparatus and  
15 method for capturing a moving image, which is being reproduced, and transmitting the captured image from phone to phone.

Also, still another object of the present invention is to provide an apparatus and method for capturing a moving image, which is being reproduced, and transmitting the captured image together with an email.

20 In order to accomplish these objects, there is provided an apparatus for transmitting a television signal in a mobile communication terminal capable of receiving the television signal, the apparatus comprising: an input section for generating signals for capturing and transmitting a received television signal; a control section for generating, according to the signals of the input section, a command signal for capture  
25 and transmission of the received television signal, the control section controlling the received television signal to be displayed and simultaneously the displayed image to be captured and transmitted; a memory for storing the television signal captured according to a capture command of the control section; and a transmission section for transmitting the captured image stored in the memory.

30 In accordance with another aspect of the present invention, there is provided a method for transmitting a television signal in a mobile communication terminal capable of receiving the television signal, the method comprising the steps of: video-processing

and displaying the received television signal; capturing the displayed image; and transmitting the captured image.

According to a first embodiment of the present invention, there is provided a method for transmitting a television signal in a mobile communication terminal capable  
5 of receiving the television signal, the method comprising the steps of: video-processing and displaying the received television signal; capturing a still image of the displayed image; and transmitting the captured still image.

According to a first embodiment of the present invention, there is provided a method for transmitting a television signal in a mobile communication terminal capable  
10 of receiving the television signal, the method comprising the steps of: video-processing and displaying the received television signal; capturing a moving image for a capture time according to a capture start command and a capture end command of the displayed moving image; and transmitting the captured moving image.

In accordance with still another aspect of the present invention, there is  
15 provided an apparatus for transmitting a signal of a moving image in a mobile communication terminal capable of reproducing the moving image, the apparatus comprising: an input section for generating signals for capturing and transmitting a moving image signal which is being reproduced; a control section for generating, according to the signals of the input section, a command signal for capture and  
20 transmission of the moving image signal which is being reproduced, the control section controlling the moving image signal to be displayed and simultaneously the displayed image to be captured and transmitted; a memory for storing the image captured according to a capture command of the control section; and a transmission section for transmitting the captured image stored in the memory.

25 In accordance with still another aspect of the present invention, there is provided a method for transmitting a signal of a moving image in a mobile communication terminal capable of reproducing the moving image, the method comprising the steps of: video-processing and reproducing the moving image signal; capturing an image which is being reproduced; and transmitting the captured image.

30

#### **[CONSTRUCTION AND OPERATION OF THE INVENTION]**

Hereinafter, an apparatus and method for transmitting a television signal



received in a mobile communication terminal according to preferred embodiments of the present invention will be described with reference to the accompanying drawings. In the following description of the present invention, a detailed description of known functions and configurations incorporated herein will be omitted when it may make the  
5 subject matter of the present invention rather unclear. It is to be noted that the same elements are indicated with the same reference numerals throughout the drawings.

In the following description, specific details – such as the number of pixels in one frame, the number of pixel which can be displayed in a display section, the number of pixels of a scaled image, the number of display characters of user data,  
10 comprehension methods of a still image and a moving image, transmission lines among each element and so forth – will be shown so as to help the overall comprehension of the present invention. However, it will be understood by those skilled in the art that the present invention can be easily embodied without the specific details or by various changes of the details.

15 Meanwhile, a term “capture” employed in the present invention has various meanings. That is, the term “capture” signifies not only temporary storage of a still image but also temporary storage of a moving image in a predetermined section.

FIG. 1 is a block diagram illustrating a construction of a mobile communication terminal according to an embodiment of the present invention. Herein, the mobile  
20 communication terminal may be a mobile telephone.

Referring to FIG. 1, the mobile communication terminal comprises a tuner 50, a decoder 60, an image processing section 70, and a display section 80 so as to receive a television broadcasting signal. Also, the mobile communication terminal comprises an RF section 21, a data processing section 23, an audio processing section 25, a control  
25 section 10, and a keypad 27 so as to perform a communication and data transmission/reception function which is a basic function.

Meanwhile, an antenna connected to the tuner 50 for receiving the television broadcasting signal and an antenna connected to the RF section 21 for performing a communication function can be realized by one antenna. In the present invention, the  
30 two antennas are illustrated respectively for convenience of description.

According to the present invention, when a television broadcasting signal received through an antenna and the tuner 50 is displayed in the display section 80, the

mobile communication terminal can simultaneously capture the displayed video image and transmit the captured image by the elements for the communication and data transmission/reception function. That is, the above-mentioned multitasking is possible because both a television mode for the reception of the television broadcasting signal  
5 and a communication mode for communication and data transmission/reception can be processed simultaneously by the elements illustrated as respective function blocks. Also, the two modes are controlled respectively by an image processing section in the control section 10, which will be described later, so that a television image can be received and displayed in real time while being captured, recorded and transmitted.

10 Hereinafter, the construction of a transmission apparatus shown in FIG. 1 according to the present invention will be described in more detail.

The RF section 21 performs a radio communication of the mobile communication terminal. The RF section 21 includes an RF transmitter for upconverting and amplifying the frequency of a transmission signal, and an RF receiver  
15 for low-noise-amplifying a received signal and downconverting a frequency thereof. The data processing section 23 comprises a transmitter for encoding and modulating the transmission signal, and a receiver for demodulating and decoding the received signal. That is, the data processing section 23 may be realized by a MODEM and a CODEC. A captured television image is encoded by the data processing section 23, and is  
20 transmitted through the RF section 21.

The audio processing section 25 reproduces a reception audio signal outputted from the data processing section 23 and transmits a transmission audio signal generated from a microphone to the data processing section 23. Also, in the television mode, the audio processing section 25 reproduces an audio signal of a television signal outputted  
25 from a decoder 60 which will be described later.

The keypad 27 comprises keys for inputting numeral and letter information, and function keys for setting a variety of functions. Also, the keypad 27 comprises a variety of mode set keys for capturing, transmitting, and storing a television image to be displayed according to an embodiment of the present invention. Particularly, in the  
30 case of capturing a moving image, mode sets for a capture start command and a capture end command are added.

A memory 29 may comprise a program memory and a data memory. The

program memory can store programs for controlling general operations of the mobile communication terminal and programs for processing a television image signal according to an embodiment of the present invention. Also, the data memory temporarily stores data generated during the performance of the programs.

5 That is, a still image and a moving image captured according to the present invention are stored in the data memory 29 temporarily or permanently.

Meanwhile, the image processing section 70 constructs a moving image according to a received television signal by the unit of frame, temporarily stores the constructed image in its own memory, and transmits the image to the display section 80.

10 Also, the image processing section 170 reads data of a previous stored frame and outputs the read data to the display section, and also stores data of a current frame. As described above, since data of every frame are stored and read in real time through a memory included separately in the image processing section 70, the memory 29 connected to the control section can be utilized as a memory for storing the data of the  
15 frames.

When a still image is transmitted according to an embodiment of the present invention, data of one frame temporarily stored in real time in the image processing section 70 can be transmitted directly without being separately stored in the memory 29. The process in the image processing section 70 will be explained later in more detail  
20 with reference to FIGs. 2 and 3.

The control section 10 controls the overall operation of the mobile communication terminal. Also, the control section 10 may include the data processing section 23. According to an embodiment of the present invention, when the control section 10 receives a capture or a transmission command from the keypad 27 while a  
25 television image is displayed (that is, in a television mode), the control section 10 controls the television image to be displayed and simultaneously captured or transmitted (that is, operation of a communication mode).

With the television mode, the control section 10 controls the image processing section 70 to display a television image received according to the determined television  
30 mode, and simultaneously outputs a user data set of the television mode to the image processing section 70. Also, with the communication mode, the control section 10 controls the image processing section 70 to be operated in a television mode or in an On

Screen Display (hereinafter, referred to as "OSD") mode, and outputs a user data set of the communication mode to the image processing section 70. Also, in a case of performing a voice communication mode of the communication mode, the control section 10 blocks the path of a television audio signal outputted from a decoder 60 which will be described later, thereby controlling the voice communication to be performed.

The tuner 50 receives a television image signal of a selected channel under the control of the control section 10, and frequency-converts a received television image signal. The decoder 60 demodulates and decodes a composite image signal for a television in which the composite image signal is outputted from the tuner 50. The decoder 60 divides the composite image signal into a voice and an image signal, decodes the divided voice signal and image signal, transmits the decoded voice signal to the audio processing section 25, and transmits the decoded image signal to the image processing section 70. Also the decoder 60 decodes the television image signal, and then outputs color signals (R, G, and B) and synchronizing signals (a vertical synchronizing signal and a horizontal synchronizing signal).

The image processing section 70 communicates data with the control section 10, and performs a signal process function of displaying user data outputted from the control section 10 and a television image signal outputted from the decoder 60 according to a television mode or a communication mode determined by the control section 10. With the television mode, the image processing section 70 processes an image signal outputted from the decoder 60 and user data outputted from the control section 10, and outputs the processed signals to a corresponding area of the display section 80.

Herein, the user data includes current time, battery residual power display, reception sensitivity, and so forth, and also includes state data according to state change of the television mode. The image processing section 70 processes and outputs the television signal with a frame size, and classifies and outputs the television image data and the user data, respectively. Also, the image processing section 70 can perform the television mode or the OSD mode, simultaneously with the communication mode.

That is, in a case of performing the communication mode at the state of the television mode, the image processing section 70 outputs television image data, and

simultaneously outputs user data of the communication mode outputted from the control section 10. Also, in a case of performing the communication mode at the state of the OSD mode, the image processing section 70 blocks the television image data, and controls user data of the communication mode outputted from the control section 10 to  
5 be displayed. In this case, the user data may be a letter message, subscriber information, and so forth.

The display section 80 displays data outputted from the control section 10 in the communication mode, and displays television image and user data outputted from the image processing section 70 in respective corresponding areas in the television  
10 mode. At the television mode, the display section 80 displays a television image outputted from the image processing section 70 in a first display area, and displays user data in a second display area.

Also, the display section 80 can have a third display area, and the third display area can be utilized as an area displaying soft keys, such as a menu, and so forth. With  
15 a communication mode, if the mobile communication terminal is at the state of a television mode, the display section 80 displays a television image in the first display area and displays user data of the communication mode in the second display area, and if the mobile communication terminal is the state of the OSD mode, the display section 80 displays user data of the communication mode in the first and the second display  
20 area.

Herein, the display section 80 is realized by a liquid crystal display (LCD). In this case, the display section 80 can comprises a LCD controller, a memory in which image data can be stored, LCD display elements, and so forth. Herein, if the LCD is realized by a touch screen mechanism, the LCD together with the keypad can be the  
25 input section.

FIG. 2 is a block diagram illustrating a construction of the television receiver of the construction shown in FIG. 1.

The operation of a television mode in a mobile communication terminal will be described with reference to FIG. 2 as follows. When a user selects a television mode,  
30 the control section 10 informs the image processing section 70 of the selected mode. Then, the image processing section 70 outputs control data for selecting a channel to the tuner 50, and drives the decoder 60. Subsequently, the tuner 50 is synchronized with a



channel corresponding to the channel control data outputted from the image processing section 70, receives and frequency-converts a television image signal received through the synchronized channel, and outputs the frequency-converted signal to the decoder 60.

The decoder 60 decodes the television image signal received from the tuner 50, and outputs a RGB analog image signal and synchronizing signals (a horizontal and a vertical synchronizing signal). The decoder 60 separates color signals from received composite image signals, and outputs the separated color signals. Herein, the decoder 60 can be realized by an NTSC decoder.

The image processing section 70, which receives a RGB image signal and synchronizing signals outputted from the decoder 60, adds user data to the television image signal, and then displays the television image together with the added user data in the display section 80. In this case, the user data can be user data outputted from the control section 10. Also, the user data may be generated from the image processing section 70 under the control of the control section 10. The above-mentioned user data are displayed on the television image in On Screen (that is, OSD).

The image processing section 70 receives an RGB analog television image signal, converts the received analog image signal into digital data by a built-in analog-to-digital converter (A/D converter), and outputs the digital data to the display section 80. Also, the image processing section 70 can display user data outputted from the control section 10 or user data generated from the inside under the control of the control section 10 in OSD, and has a capture function of the displayed television screen and a block copy function of OSD.

When receiving a capture command in a television mode as described above, the control section 10 informs the image processing section 70 of the generation of the capture command. Then, the image processing section 70 displays a received television image in the first display area of the display section 80, and simultaneously displays a menu related to the capture command in the second display area. Also, when a television image signal is displayed in an enlarged state in the first and the second display area of the display section 80, the image processing section 70 reduces and displays the television image to the first display area, and displays a menu related to the capture command in the second display area.

Also, an image captured according to the capture command is transmitted from

the image processing section 70 and stored in the memory 29 by the control of the control section 10.

FIG. 3 is a detailed block diagram illustrating the construction of an image processing section 70 shown in FIGs. 1 and 2, and FIG. 4 is a view illustrating data access timing between the control section 10 and the image processing section 70.

Referring to FIGs. 3 and 4, the operation of the image processing section 70 will be described as follows. An A/D converter 111 converts an RGB analog signal outputted from the decoder 60 into digital data. Herein, it is assumed that the A/D converter 111 converts the RGB analog signal into 18-bit RGB digital data (65536 colors).

A scaler 113 receives RGB digital data outputted from the A/D converter 111, and a horizontal synchronizing signal HSYNC and a vertical synchronizing signal VSYNC outputted from the decoder 60, and then performs a scaling operation of the quantity of the RGB digital data on the basis of the synchronizing signals. The scaling operation is as follows. First, the scaler 113 determines the size of a display image. Second, from the determined size of the display image, a horizontal and a vertical size VXSIZE and VYSIZE are determined.

In an embodiment of the present invention, it is assumed that the television image signal is scaled by dimensions from maximum  $220 \times 176$  pixels to minimum  $100 \times 75$  pixels. Third, a scaling rate (enlargement ratio/reduction ratio) is determined. Fourth, ' $720 \times 4096 / \text{VXSIZE}$ ' is calculated about a horizontal direction and the calculated value is determined as 'HLSR', and ' $240 \times 2048 / \text{VYSIZE}$ ' is calculated about a vertical direction and the calculated value is determined as 'VLSR'. In an embodiment of the present invention, it is assumed that an inputted image signal is scaled by dimensions to maximum  $220 \times 176$  pixels. Also, the scaler 113 converts the 18-bit RGB data into 16-bit RGB data. Herein, the 16-bit RGB data [15:0] comprises 5-bit Red (R) data [15:11], 6-bit Green (G) data [10:5], and 5-bit Blue (B) data [4:0].

Data of a frame size ( $176 \times 220 \times 12$  bits) are stored in memories 131, 133, and 135. At a television mode, the memory 131 is used to store user data, and the memories 133 and 135 are used to store image data. Also, in an OSD mode, the memories 131 and 133 are used to store user data, and the memory 135 is used to store a

background screen data.

A memory controller 123 controls the access to the memories 131, 133, and 135 under the control of the control section 10. The memory controller 123 controls the memories 131, 133, and 135 separately according to a television mode or an OSD mode. First, in a television mode, the memory controller 123 accesses user data outputted from the control section 10 into the first memory 131, stores current frame image data outputted from the scaler 113 into the second memory 133 (or the third memory 135), and outputs the previous frame image data stored in the third memory 135 (or the second memory 133).

10 The memory controller 123 stores and outputs received television RGB image data by the unit of frame in the memories 133 and 135. At this time, if current frame image data are stored in the second memory 133, previous frame image data stored in the third memory 135 are outputted, and if current frame image data are stored in the third memory 135, previous frame image data stored in the second memory 133 are  
15 outputted. That is, when accessing data to the memories 133 and 135, the memory controller 123 stores received frame data and simultaneously outputs previous frame data which have been stored, so that television image signals are processed in real time.

That is, since 30 frames per second must be processed when a television image is displayed, image signals are transmitted to the display section 80 in real time using  
20 two frame memories. Also, the memory controller 123 outputs frame image data to the display section 80 during a frame period (a vertical synchronizing signal period), and outputs user data stored in the first memory 131 in an idle period before the next frame is processed. In other words, the memory controller 123 outputs frame image data stored in the memory 133 or 135 during each frame period (one vertical  
25 synchronizing signal period), in which an image signal exists, and outputs user data stored in the memory 131 during the idle period.

Secondly, in an OSD mode, the memory controller 123 uses the first and second memory 131 and 133 for the purpose of accessing user data, and uses the third memory 135 for the purpose of storing background screen data. Only one, not both, of  
30 the memories 131 and 133 may be set and used.

An OSD mixer 125 mixes the user data and image data of a frame size with each other, which are outputted from the memory controller 123, as On-Screen data, and



then outputs the mixed data to the display section 80. A timing controller 121 generates a pixel clock DOTCLK and synchronizing signals (a horizontal synchronizing signal HSYNC and a vertical synchronizing signal VSYNC) which are detected in a television mode. The timing controller 121 synchronizes image data pixels, line image data, and frame image data outputted from the OSD mixer 125 with each other and then outputs them to the display section 80.

A control interface 117 interfaces user data and mode control data between the control section 10 and the image processing section 70. In an embodiment of the present invention, the control interface 117 in the image processing section 70 interfaces a 17-bit address and 16-bit data with the control section 10. In this case, a frame memory of the image processing section 70 is accessed when the highest bit (A16) of the address is '1', and a register of the image processing section 70 is accessed when the highest bit (A16) of the address is '0'.

Referring to FIG. 4, first, when outputting data to the image processing section 70, the control section 10 selects the image processing section 70 as indicated by a reference number 211, and activates a write mode as indicated by a reference number 213. Also, The control section 10 outputs an address MA[16:0] as indicated by a reference number 217 and user data MD[15:0] as indicated by a reference number 219, thereby recording user data in the image processing section 70. In this case, the user data may be data, such as current time, battery residual power, reception sensitivity, etc., control data for television screen control and mode set, menu data, and so forth.

Secondly, when accessing data from the image processing section 70, the control section 10 selects the image processing section 70 as indicated by a reference number 221, and activates a read mode as indicated by a reference number 225. Also, The control section 10 outputs an address MA[16:0] as indicated by a reference number 227, thereby accessing user data MD[15:0] of a corresponding address as indicated by a reference number 229. The control interface 117 performs an interface function so that the image processing section 70 can process the output of the control section 10 shown in FIG. 4.

An I2C interface 115 has an I2C bus master capable of controlling two slave devices. The I2C interface 115 controls the tuner 50 and the decoder 60, and is

controlled by the control interface 117.

An OSD controller (OSD RAM Block Copy Accelerator) 119 can copy any rectangular area of the user data in any position. The OSD controller 119 can block-copy data of any rectangular area in any position of a displayed image screen, by control  
5 data of the control section 10 outputted from the control interface 117. The copy function can be performed in a memory or between memories. With the television mode, the block copy can be performed only in the first memory 131, while with the OSD mode, the block copy can be performed in the first memory 131, in the third memory 133, and between the two memories 131 and 135.

10 Also, in order to realize the present invention, the image processing section 70 further comprises a file compressor 137 and an image converter 139. The file compressor 137 and the image converter 139 function to compress and convert a captured image according to the control of the memory controller 123.

To be more specific, frame image data converted through the scaler 113 are  
15 stored in the memory 131 by the unit of frame in real time as described above, and a process to compress the frame image is required when the image is captured and transmitted according to the present invention. The image compression is performed in the file compressor 137.

Meanwhile, when moving image data are captured and transmitted, images are  
20 stored in the memory 131 and read from the memory 131 by the unit of frame, so that the frame data must be accumulated and separately stored. In this case, similarly, the accumulated and stored moving image is compressed through the file compressor 137.

When captured data are still image data, the file compressor 137 can compress the data in one selected from the group consisting of JPEG, BMP, GIF, PIC, TIFF, PDF,  
25 and EPS formats. Also, when captured data are moving image data, the file compressor 137 can compress the data in one selected from the group consisting of MPEG, ASF, ASX, AVI, DAT, FLI, FLC, MOV, MPG, RA, RAM, RM, VOB, and VIV formats.

When captured data for transmission are still image data, the image converter  
30 139 converts the size of image so as to fit with the display size of a mobile communication terminal of receiving-side. For example, the frame image data are converted into 128×12 dots or 128×96 dots size according to the standard of a mobile

communication supplier.

Meanwhile, still image data converted in the image converter 139 may be transmitted without compression. For example, if a terminal of receiving-side doesn't not have a function of decompressing image data, it is preferred that the still image is  
5 transmitted without compression.

FIG. 5 is a view illustrating the display area of the display section 80 shown in FIG. 1. The display section 80 has a first display area 81 for displaying a television image received in a television mode and a second display area 83 for displaying user data. Also, the display section 80 may further comprise a third display area 85 in  
10 which a soft key information for the set of a television mode and an OSD mode is displayed. In an embodiment of the present invention, the first display area 81 (or the first and second display area) is used to display a television image, and the third area 85 is used to display a menu for capture and transmission of a television image.

FIG. 6 is a view illustrating an example of the constructions of the keypad 27  
15 and the display section shown 80 according to an embodiment of the present invention. In the construction of the keypad 27, a TV-mode ON key 31 is a key for setting a mobile communication terminal to a television mode. When a TV key is pressed for a long time, the control section 10 senses the long input of the key as the operation of the TV-mode ON key 31. Also, a TV-mode screen size key 33 is a key for switching the size  
20 and direction of a screen displayed in the display section 80. When the TV key is pressed for a short time, the control section 10 senses the short input of the key as the operation of the TV-mode screen size key 33.

An embodiment of the present invention shows an example in which the TV-mode ON key and the TV-mode screen size key are realized by one key, but the TV-  
25 mode ON key and the TV-mode screen size key may be independently realized by respective keys. A TV-mode capture key 35 enables its operation to be sensed by the control section 10 when an OK key or a capture key is pressed at the display state of a TV screen signal according to the set of the television mode. A menu key 37 functions to set a television mode, and to control channels, screen, timer, and so forth at the state  
30 in which the television mode has been set.

According to the present invention, when a capture key or an OK key is pressed in a television mode, a capture mode is performed. In the capture mode, a still

image or a moving image can be captured according to two embodiment of the present invention. According to the detail functions of the embodiments, respective detail functions are displayed in the display section. Detail functions according to the embodiments will be described later.

5           FIG. 7 is a flowchart for explaining a process of capturing and transmitting a received television signal according to an embodiment of the present invention.

Referring to FIG. 7, first, at step 701, a television reception mode is set, a received television image is displayed through the display section of the mobile communication terminal.

10           At the state of performing the television mode, a capture menu is displayed (step 703). When a screen capture key is operated with reference to the displayed capture menu, the control section 10 senses this at step 705, and displays a select menu for selecting one of a still image capture and a moving image capture.

          If the still image capture of the select menu is selected (step 709), a still image  
15   which is been currently displaying is captured at step 713. At this time, in order to edit or confirm the captured still image, the displayed image can be stopped in the instant the displayed image is captured. As another method, it is possible that even though a currently displayed image is captured, a television moving image is continuously displayed, while a lower menu is changed into a store or a transmission menu so that the  
20   performance of a capture command can be judged.

          If a moving image capture is selected in the select menu, both a capture start time and a capture end time of a currently displayed moving image are determined at step 711, thereby enabling the moving image to be captured for the determined time. That is, a user determines a capture start time and a capture end time through key input  
25   of the terminal while showing moving images displayed in real time. Meanwhile, for the sake of convenience of the key input, it is possible that a point of time at which a moving image capture is selected in the select menu is set as a capture start time of the moving image, and a user determines only a capture end time additionally. In this case, it is preferred that the television image is displayed in the first display area which has  
30   nothing to do with the capture operation.

          The captured moving image is compressed at step 715. Since the captured moving image has a large amount of file as compared to general data, it is preferred to

store and transmit the file after compression. The compression can be performed in one selected from the group consisting of MPEG, ASF, ASX, AVI, DAT, FLI, FLC, MOV, MPG, RA, RAM, RM, VOB, and VIV formats, and it is apparent to those skilled in the art that any other moving image compression format can be applied to the present  
5 invention.

The captured still image or moving image can be transmitted and stored according to the present invention. Meanwhile, according to the present invention, it is preferred that transmission and storage of the image are performed while a user watches the television image in real time.

10 That is, in this mobile communication terminal, a television image is displayed through the first display area of the display section so that a user can watch the television image, and simultaneously the transmission and the store work of the television image can be performed through another display area (for example, the second display area or the third display area) of the display section.

15 When the capture of a still image or a moving image is terminated, a store and transmission menu is displayed in the display section. Subsequently, when a store menu is selected (step 717), the captured data are stored at step 721.

Meanwhile, according to the present invention, a transmission menu is selected (step 719), a menu enabling any one of a phone-to-phone transmission and an email  
20 transmission is displayed. When the phone-to-phone transmission of the menu is selected at step 723, the captured image is transmitted according to a general phone-to-phone transmission method at step 727.

Also, when the email transmission of the menu is selected at step 725, the captured image is transmitted according to a general email transmission method at step  
25 729.

Hereinafter, the transmission methods will be described in more detail. The transmission of a television still image and a television moving image can be realized by a plurality of methods. Meanwhile, since a transmission process of the image means a data transmission toward an object terminal, a process according to a  
30 communication mode must be performed, and simultaneously a television mode as described above must be performed.

Also, the image data can be transmitted directly to a reception terminal after a



data channel is set with the reception terminal, also can be downloaded to a reception terminal according to the request of a receiver after the image data is stored temporarily in a server of a service provider.

A method of storing the image data in a server of a service provider and  
5 transmitting the stored data will be described as follows. When the image data are transmitted with a telephone number of a reception terminal, the image data and the telephone number of the reception terminal are stored in a server of a service provider. The service provider informs the reception terminal that image data to be transmitted from a transmission terminal are. Informing the reception terminal that reception data  
10 exist may be realized by a short message service (SMS).

Meanwhile, the reception terminal receives an information that image data to be received are, is connected to the service provider, and downloads the image data.

Hereinafter, described will be another method in which image data are transmitted together with an email. The transmission terminal inputs or selects an  
15 email address for a reception terminal through a selection of an email transmission menu, and transmits an email message with which the image data are appended.

When the image data, which are appended with an email message, are transmitted as described above, the receiving-side can receive the email message and the appended image data through a mobile communication terminal and/or a general  
20 computer terminal linked to on-line environment.

Meanwhile, when a still image is transmitted from phone to phone as described above, the display size of a reception terminal may differ from the display standard of a network service provider. Therefore, the still image must be converted into an appropriate size (for example, 128×12 or 128×96 dots) through the image converter 139.

25 However, when a file is transmitted through an email, it is not necessary to convert the display size into the display size required by a network service provider, so that it is possible to compress and transmit data in the own size (for example, 128×160 dots). Also, when data are transmitted through an email, the transmission is performed after additional processes, such as object, contents, appending, and so forth.  
30 Meanwhile, an email address of receiving-side may be directly inputted or may be selected through the search of stored addresses, according to the construction of a menu.

FIG. 8 is a view illustrating the states of the display section when a still image

is transmitted according to a first embodiment of the present invention.

FIGs. 8 and 9, which will be described later, are views illustrating display sections of a mobile communication terminal. For convenience of explanation, a first display area to display a television moving image and a second display area to display a menu to enable a capture function according to the present invention to be performed are shown in a simplified form in FIGs. 8 and 9.

Also, FIGs. 8 and 9 show that each menu is selected and performed according to the present invention and simultaneously television moving images are displayed in real time.

10 Referring to FIG. 8, in Screen 801, a television moving image is displayed in the first display area in real time, and buttons for selecting one of a menu 803 and a capture 805 are displayed in the second display area located at a lower part. It is preferred that the menu button 803 is linked to functions related to a television mode of a mobile communication terminal, the detailed explanation of the menu will be  
15 described with reference to FIG. 10 later.

Meanwhile, the capture button 805 is selected, a selection menu for selecting one of a still image 809 and a moving image 811 is displayed as shown in Screen 807. Next, the button of the still image 809 is selected in the Screen 807, the image of the still image displayed in the instant of selecting the button of the still image 809 is  
20 captured. Also, it is preferred that the still image captured in the instant of selecting the button of the still image 809 is stored separately in a temporary memory, and that the present invention is realized so that the television moving images are continuously displayed regardless of the capture process.

When the button of the still image 809 is selected and a still image is captured,  
25 a store button 815 and a transmission button 817 are displayed as shown in Screen 813. Next, the store button 815 is selected, a still image which has been captured and temporarily stored in a memory is stored in a predetermined memory area and maintained. In this case, it is apparent to those skilled in the art that a menu can be added so as to endow the captured image with a file name.

30 Meanwhile, when the transmission button 817 is selected in the Screen 813, a selection menu for selecting one of a phone-to-phone transmission 821 and an email transmission 823 is displayed as shown in Screen 819.

According to the section of the phone-to-phone transmission 821 and the email transmission 823, the data of the still image captured as described above are transmitted.

FIG. 9 is a view illustrating the states of the display section when a moving image is transmitted according to a second embodiment of the present invention.

5        FIG. 9 is a view illustrating a display section of a mobile communication terminal, as described above with reference to FIG. 8. For convenience of explanation, a first display area to display a television moving image and a second display area to display a menu to enable a capture function according to the present invention to be performed are shown in a simplified form in FIGs. 8 and 9.

10        Also, as described above, FIG. 9 shows that each menu is selected and performed according to the present invention and simultaneously television moving images are displayed in real time.

Referring to FIG. 9, in Screen 901, a television moving image is displayed in the first display area in real time, and buttons for selecting one of a menu 903 and a  
15 capture 905 are displayed in the second display area located at a lower part. It is preferred that the menu button 903 is linked to functions related to a television mode of a mobile communication terminal, the detailed explanation of the menu will be described with reference to FIG. 10 later.

Meanwhile, the capture button 905 is selected, a selection menu for selecting  
20 one of a still image 909 and a moving image 911 is displayed as shown in Screen 907. Next, when the button of the moving image 911 is selected in the Screen 907, the images of the moving image displayed from the instant of selecting the button of the moving image 911 is continuously captured and stored. It is preferred that the images of the moving image captured in real time are stored separately in a predetermined  
25 memory. In this case, since images of a moving image have a relatively large amount of data, a large capacity memory is required.

When the button of the moving image 911 is selected and a capture of images of a moving image is begun, a priority button 915 and a capture end button 917 are displayed as shown in Screen 913. When the capture end button 917 is selected, only  
30 the frames until the instant of selecting the capture end button 917 are stored, and images displayed thereafter aren't captured.

Meanwhile, if moving images captured as described above are not terminated



within an appropriate time because of the quantity of data, a case of exceeding the limitation of included memory capacity can be caused. Therefore, in a case in which the image size of a moving image to be being captured reaches a predetermined size (or in a case that the image size exceeds a predetermined maximum storable time), it is  
5 preferred to terminate the capture process by force.

When the capture end button 917 is selected and the capture of a moving image is terminated, a store button 921 and a transmission button 923 are displayed as shown in Screen 919. Next, when the store button 921 is selected, data of a moving image which are been captured and temporarily stored in a memory are stored in a  
10 predetermined memory area and maintained. In this case, it is apparent to those skilled in the art that a menu can be added so as to endow the captured image with a file name.

Meanwhile, when the transmission button 923 is selected in the Screen 919, a selection menu for selecting one of a phone-to-phone transmission 927 and an email transmission 929 is displayed as shown in Screen 925.

15 As described above, the data of the captured moving image are transmitted according to the section of the phone-to-phone transmission 927 and the email transmission 929.

FIG. 10 shows menus and roles of respective keys for servicing functions in a television mode. First, when a menu key is pressed, main menu items of a mobile  
20 communication terminal are displayed. At this state, when a television menu item is pressed, menu items of 'watch TV', 'view a stored still image', and 'view a stored moving image' are displayed as shown in FIG. 10. Next, the 'watch TV' menu is selected, menus of 'auto channel', 'screen control', 'auto-off timer', and so forth are displayed. When the 'view a stored still image' or the 'view a stored moving image'  
25 menu is selected, menus of 'name change', 'current image elimination', 'whole image elimination', and so forth are displayed.

Meanwhile, when menu keys are generated in a television mode including both cases of a QCIF screen display and the whole screen display, the control section 10 commands the image processing section 70 to display the menu screen with a QCIF  
30 screen size in the display section 80. Then, the image processing section 70 outputs image data in a QCIF screen size, outputs menu items to the second display area 83, and displays soft keys in the third display area 85.

Meanwhile, according to the present invention, in a television mode, the capture menu can be displayed as shown in FIGs. 8 and 9 so that the capture of an image linked menu buttons in the menu can be easily performed.

The capture function menu includes a still image capture menu and a moving  
5 image capture menu, and each of the capture menu includes a store menu and a transmission menu. Also, each of the transmission menus includes a phone-to-phone transmission menu and an email appending transmission menu.

Meanwhile, it is apparent to those skilled in the art that general menus, which are used generally when a file is stored, such as a file-name setting menu, can be added  
10 in the store menu as described above. Also, it is apparent to those skilled in the art that a menu for input of a receiving-side information must be necessarily included in the transmission menu. For example, in a case of transmitting an image together with an email, a menu for inputting an email address of a receiving-side or for selecting an email address of a receiving-side through memory search must be included, and in a  
15 case of transmitting an image according to a phone-to-phone method, a menu for inputting a telephone number of a receiving-side or for selecting a telephone number of a receiving-side through memory search must be included.

While the detailed embodiments of the present invention has been described generally about examples in which a television signal is received and reproduced, it is  
20 apparent to those skilled in the art that the present invention can be applied to the reproduction of a general moving image in a mobile communication terminal having a moving image reproduction function. For example, the present invention can be applied to communication broadcasting Service and Multimedia Broadcast/Multicast Service (hereinafter, referred to as "MBMS") which are discussed in the third  
25 generation mobile communication, and also can be applied to the reproduction of a moving image stored in mobile communication terminal in the same way.

In the case of reproducing a moving image by the MBMS, a user may request a service provider, which provides the MBMS and a moving image, to transmit a required moving image to a specific object. However, it causes a burden of additional cost  
30 generation. Particularly, an apparatus for capturing and transmitting a specific part of the whole moving image can be realized more efficiently by the present invention. Also, according to the present invention, in a case of transmitting a moving image

which has been stored in the own mobile communication terminal, a user can capture only required part of the moving image and simultaneously can transmit the captured part, while the moving image is being reproduced.

## **5 [EFFECTS OF THE INVENTION]**

As described above, the present invention has advantages in that while images of a moving image are reproduced in a mobile communication terminal, a still image or the moving image can be captured in real time, and also simultaneously the captured image can be record and transmitted.

10        While the invention has been shown and described with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

## [PATENT CLAIMS]

1. An apparatus for transmitting a signal of a moving image in a mobile communication terminal capable of reproducing the moving image, the apparatus  
5 comprising:
  - an input section for generating signals for capturing and transmitting a moving image signal which is being reproduced;
  - a control section for generating, according to the signals of the input section, a command signal for capture and transmission of the moving image signal which is  
10 being reproduced, the control section controlling the moving image signal to be displayed and simultaneously the displayed image to be captured and transmitted;
  - a memory for storing the image captured according to a capture command of the control section; and
  - a transmission section for transmitting the captured image stored in the  
15 memory.
2. An apparatus as claimed in claim 1, wherein the captured image is still image data.
- 20 3. An apparatus as claimed in claim 1, wherein the captured image is moving image data.
4. An apparatus as claimed in claim 1, further comprising a file compressor for compressing the captured image.  
25
5. An apparatus as claimed in claim 2 or 4, wherein the file compressor compresses the still image data in one selected from the group consisting of JPEG, BMP, GIF, PIC, TIFF, PDF, and EPS formats.
- 30 6. An apparatus as claimed in claim 3 or 4, wherein the file compressor compresses the moving image data in one selected from the group consisting of MPEG, ASF, ASX, AVI, DAT, FLI, FLC, MOV, MPEG, MPG, RA, RAM, RM, VOB, and VIV

formats.

7. An apparatus as claimed in claim 1, further comprising an image converter for converting a video image size of the captured image.

5

8. An apparatus as claimed in claim 7, wherein the converted image size is one of dimensions including 128×112 dots and 128×96 dots.

9. An apparatus as claimed in claim 1, wherein the transmission section  
10 transmits a captured image, which is stored in the memory, by a phone-to-phone method.

10. An apparatus as claimed in claim 1, wherein the transmission section transmits a captured image, which is stored in the memory, together with an email.

11. An apparatus as claimed in claim 1, further comprising a display  
15 section which includes a first display area for video-processing and displaying the moving image signal and a second display area for displaying a user function selection menu in such a manner that the menu can be selected by the input section.

12. A method for transmitting a signal of a moving image in a mobile  
20 communication terminal capable of reproducing the moving image, the method comprising the steps of:

video-processing and reproducing the moving image signal;  
capturing an image which is being reproduced; and  
25 transmitting the captured image.

13. A method as claimed in claim 12, wherein the step of reproducing the moving image signal is performed simultaneously with the steps of capturing and transmitting the image.

30

14. A method as claimed in claim 12, wherein the captured image is still image data.

15. A method as claimed in claim 12, wherein the captured image is moving image data.
- 5 16. A method as claimed in claim 12, further comprising a step of storing the captured image in a memory after the step of capturing the image.
17. A method as claimed in claim 12, further comprising a step of compressing the captured image after the step of capturing the image.
- 10 18. A method as claimed in claim 12 or 17, wherein the file compression is performed in one selected from the group consisting of JPEG, BMP, GIF, PIC, TIFF, PDF, and EPS formats.
- 15 19. A method as claimed in claim 15 or 17, wherein the file compression is performed in one selected from the group consisting of MPEG, ASF, ASX, AVI, DAT, FLI, FLC, MOV, MPEG, MPG, RA, RAM, RM, VOB, and VIV formats.
- 20 20. A method as claimed in claim 12, further comprising a step of converting the size of the captured image after the step of capturing the image.
21. A method as claimed in claim 20, wherein the converted image size is one of dimensions including 128×112 dots and 128×96 dots.
- 25 22. A method as claimed in claim 12, wherein the captured image is transmitted by a phone-to-phone method.
23. A method as claimed in claim 12, wherein the captured image is transmitted together with an email.
- 30 24. A method as claimed in claim 12, wherein the display step is performed in such a manner that the moving image signal, which is being reproduced, is

video-processed and displayed in a first display area of a display section in a mobile communication terminal and a user function selection menu is displayed in a second display area so as to enable the menu to be selected by the input section.

5           25.     An apparatus for transmitting a television signal in a mobile communication terminal capable of receiving the television signal, the apparatus comprising:

              an input section for generating signals for capturing and transmitting a received television signal;

10           a control section for generating, according to the signals of the input section, a command signal for capture and transmission of the received television signal, the control section controlling the received television signal to be displayed and simultaneously the displayed image to be captured and transmitted;

              a memory for storing the television signal captured according to a capture  
15 command of the control section; and

              a transmission section for transmitting the captured image stored in the memory.

              26.     A method for transmitting a television signal in a mobile communication terminal capable of receiving the television signal, the method  
20 comprising the steps of:

              video-processing and displaying the received television signal;

              capturing the displayed image; and

              transmitting the captured image.

25           27.     A method for transmitting a television signal in a mobile communication terminal capable of receiving the television signal, the method comprising the steps of:

              video-processing and displaying the received television signal;

              capturing a still image of the displayed image; and

30           transmitting the captured still image.

              28.     A method for transmitting a television signal in a mobile

communication terminal capable of receiving the television signal, the method comprising the steps of:

- video-processing and displaying the received television signal;
- capturing a moving image for a capture time according to a capture start
- 5 command and a capture end command of the displayed moving image; and
- transmitting the captured moving image.



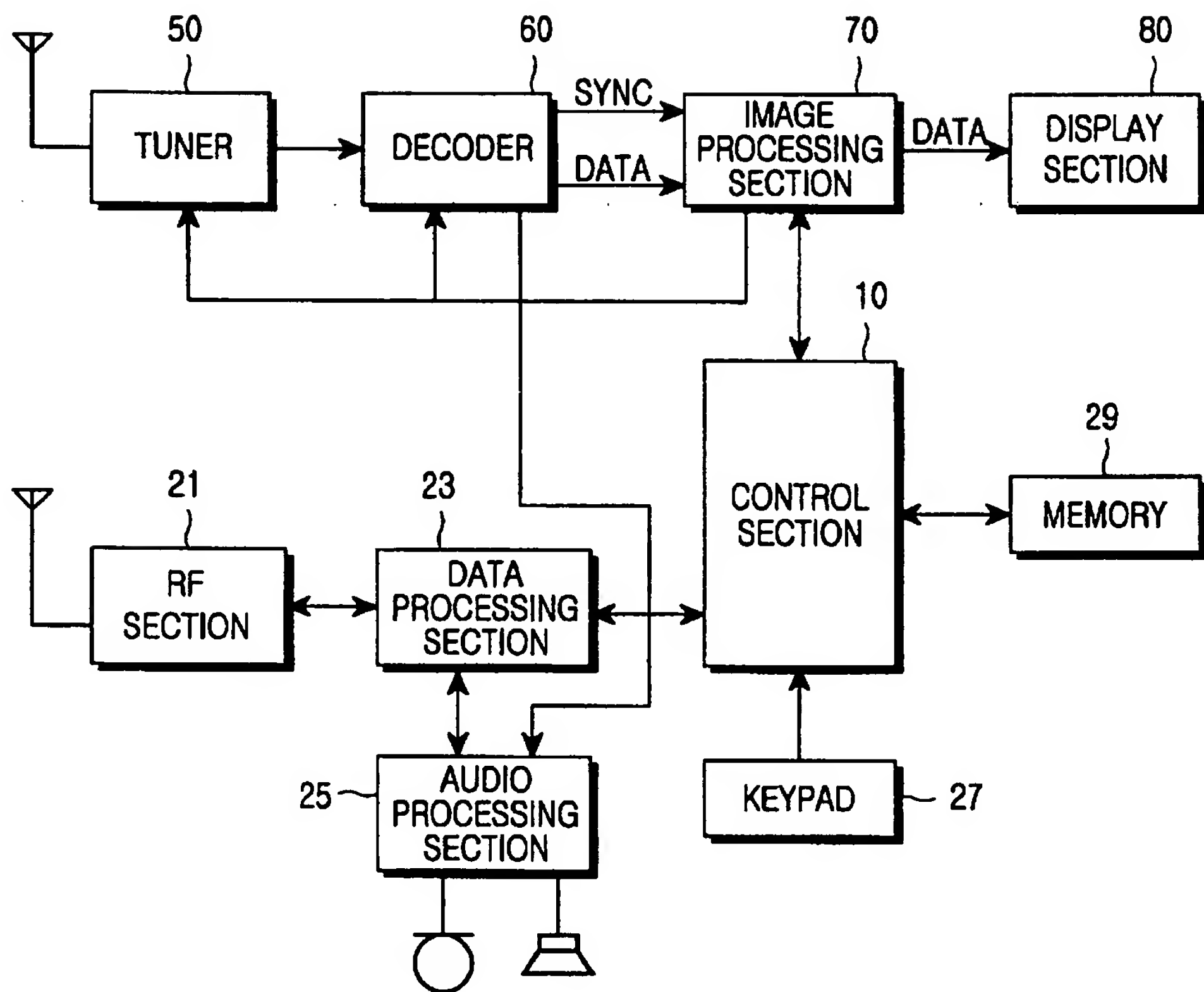


FIG.1

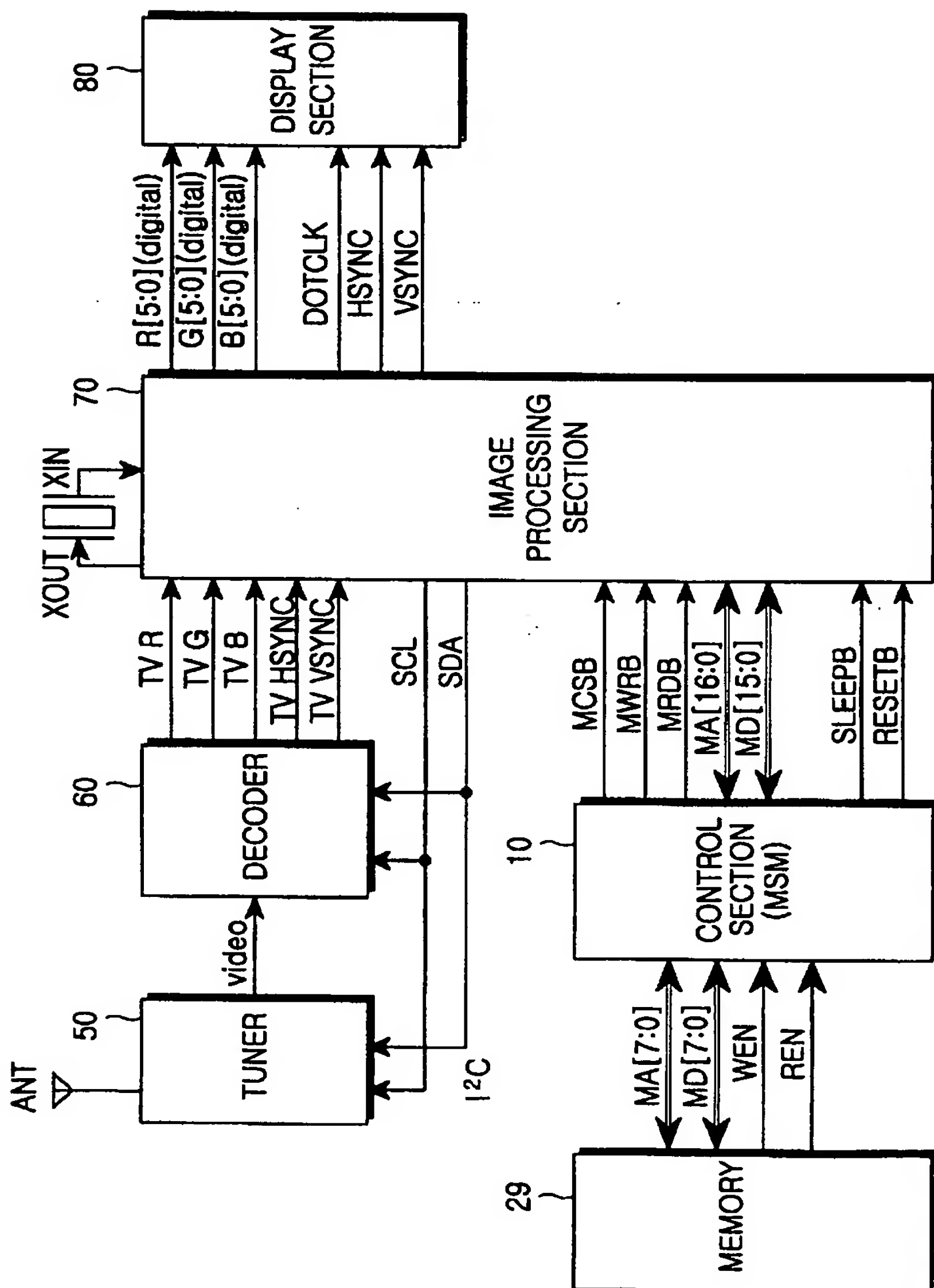


FIG.2

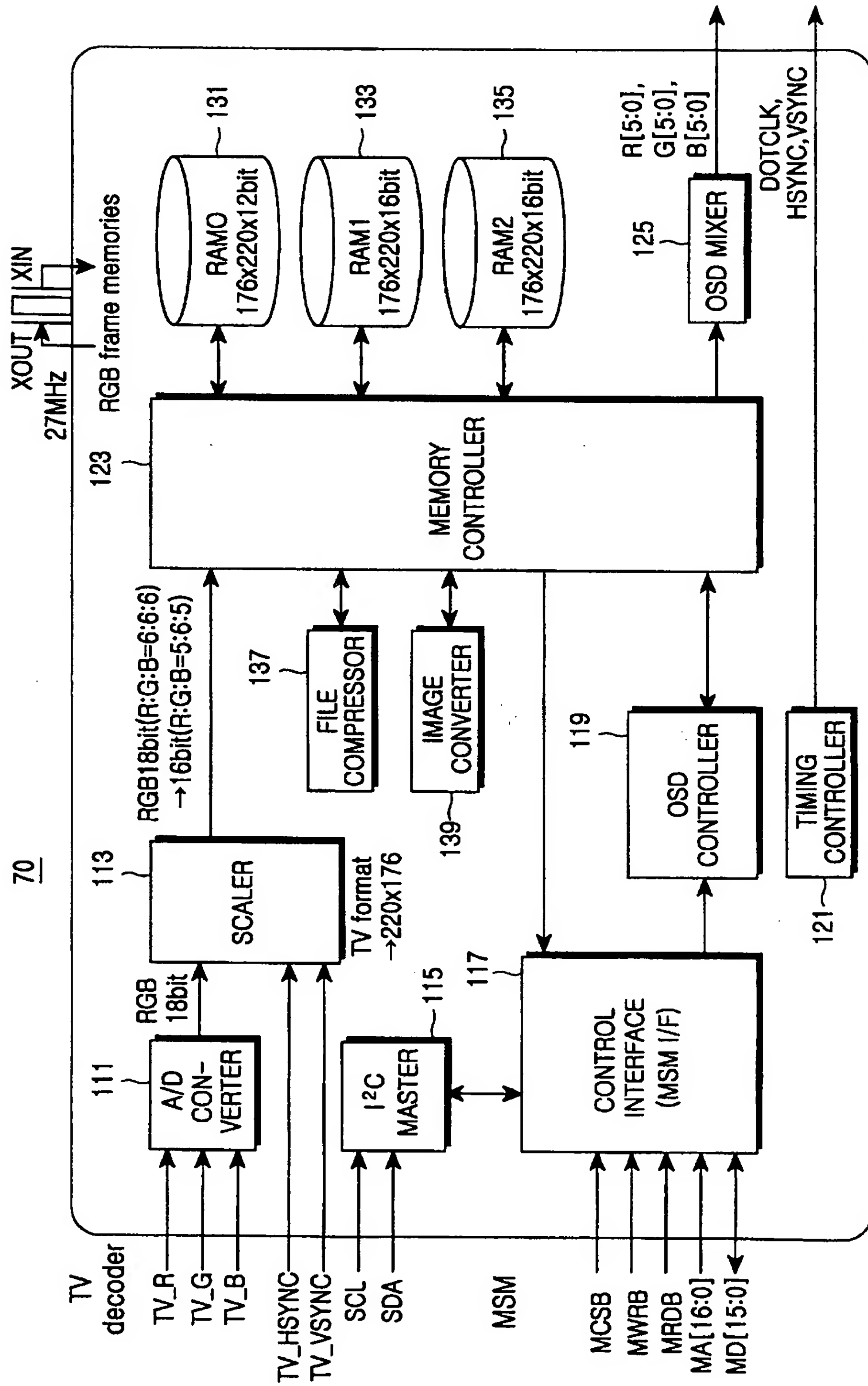


FIG. 3

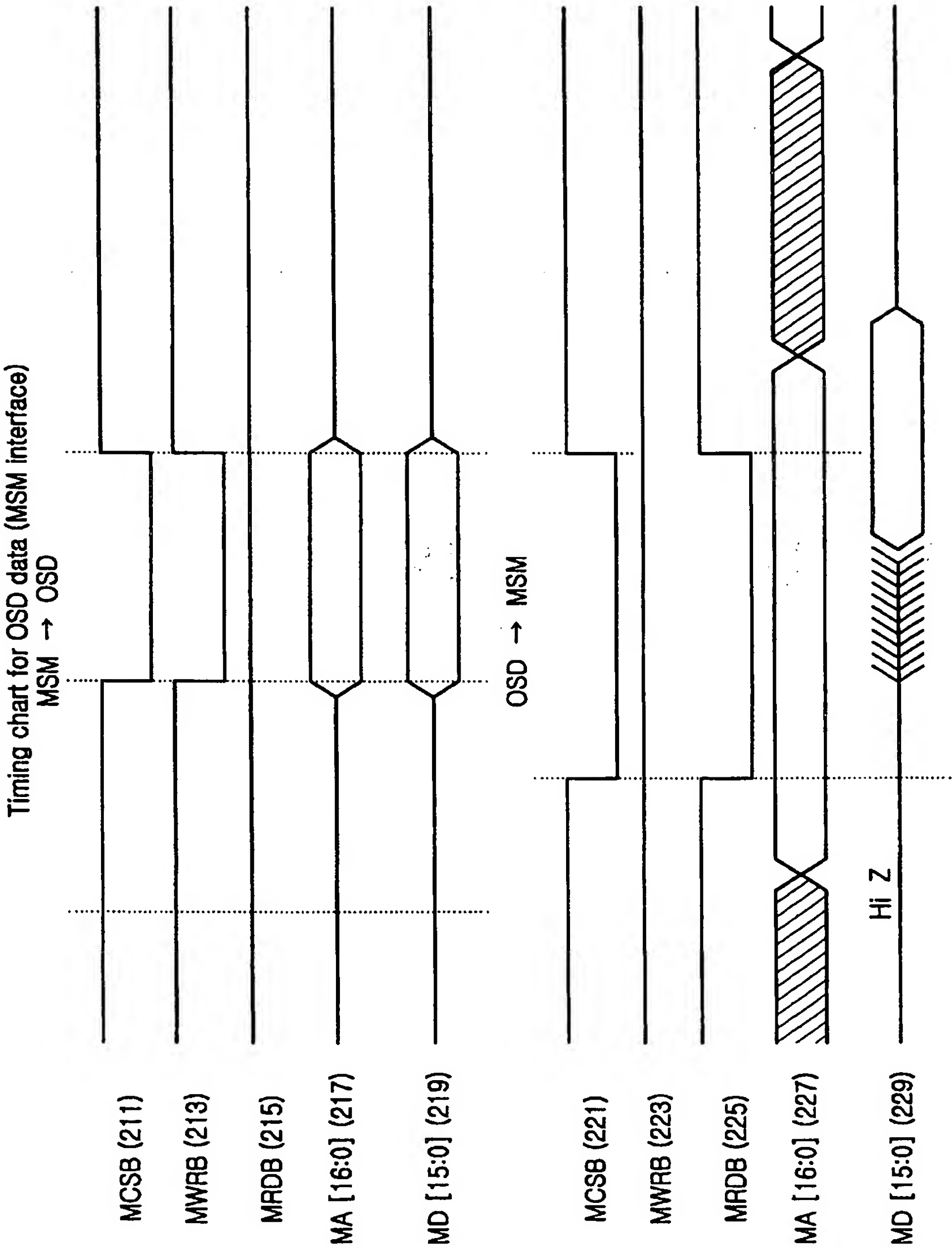


FIG.4

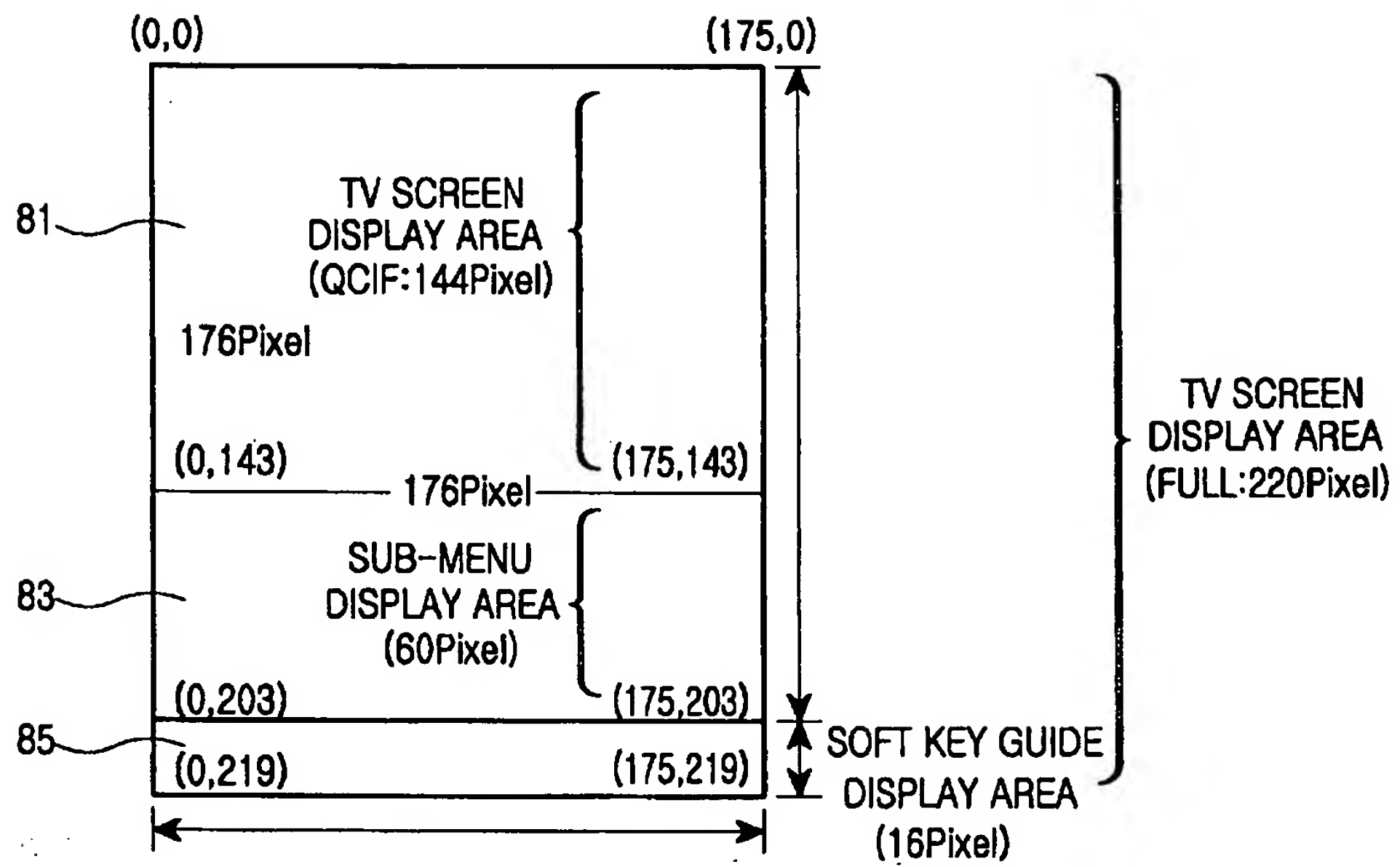


FIG.5

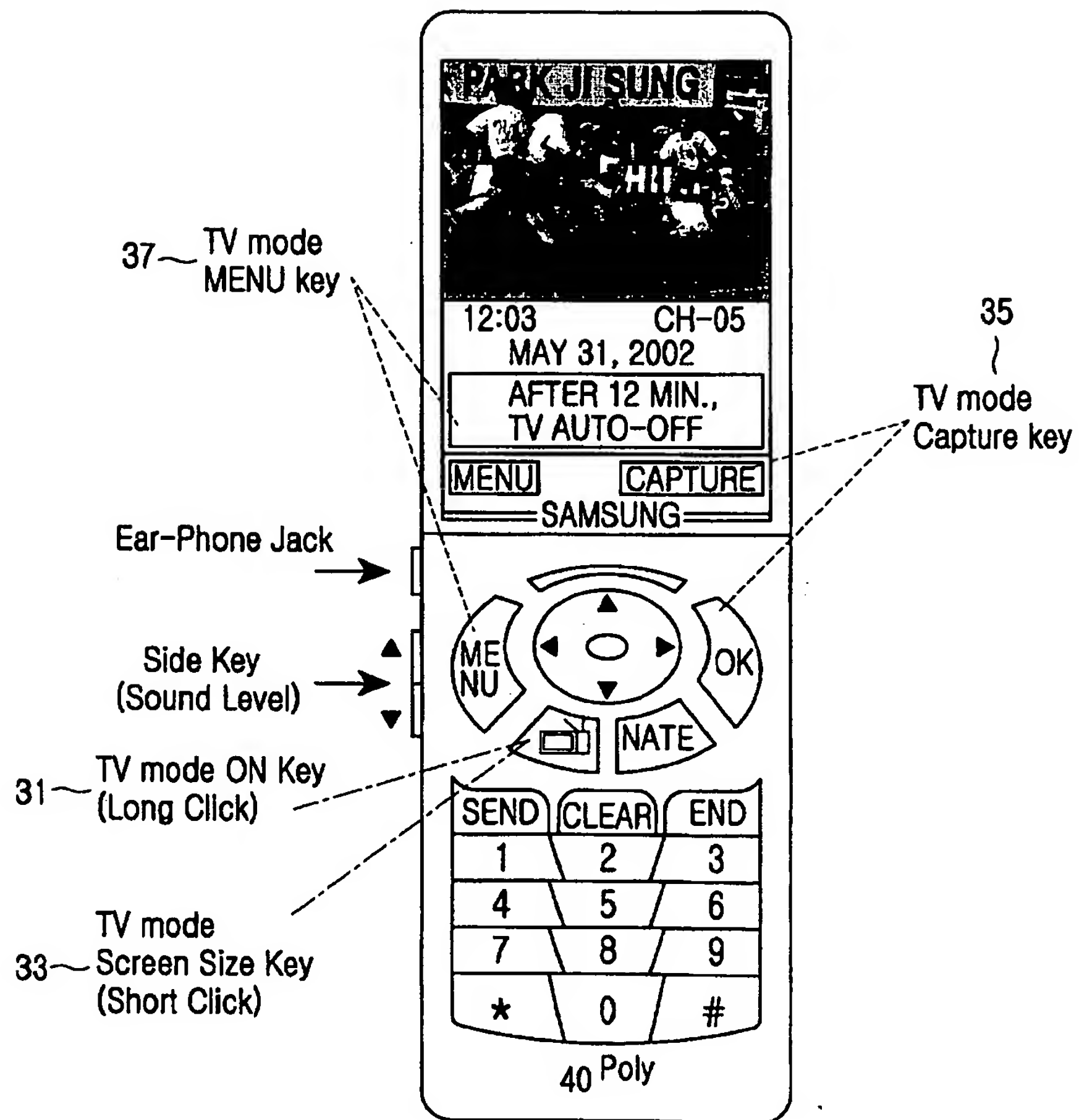


FIG. 6

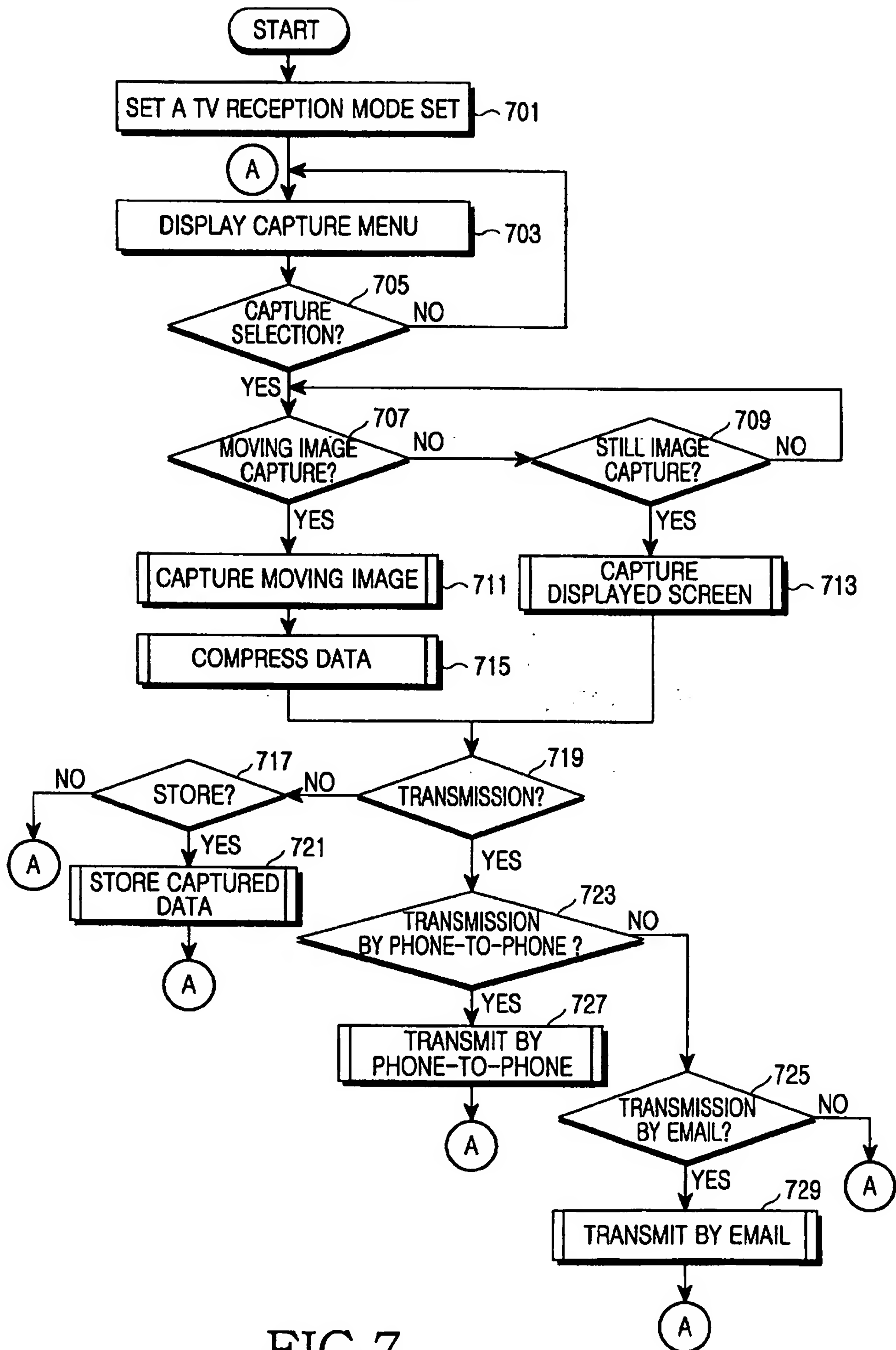


FIG.7

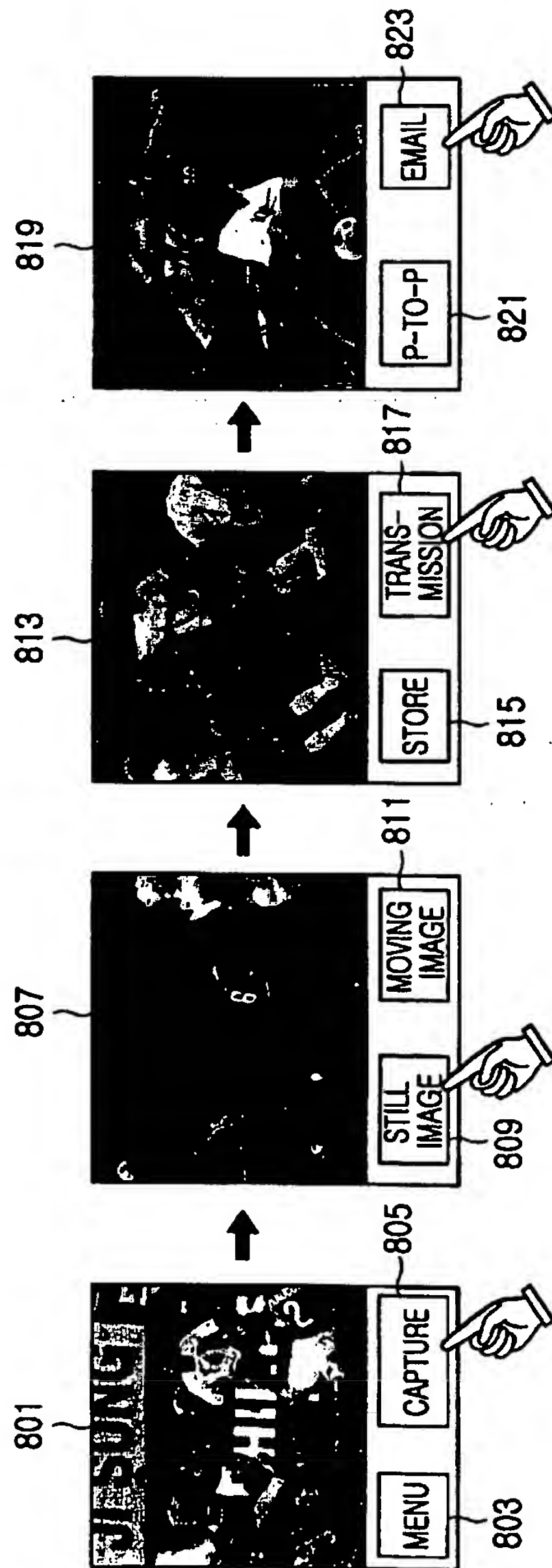


FIG.8



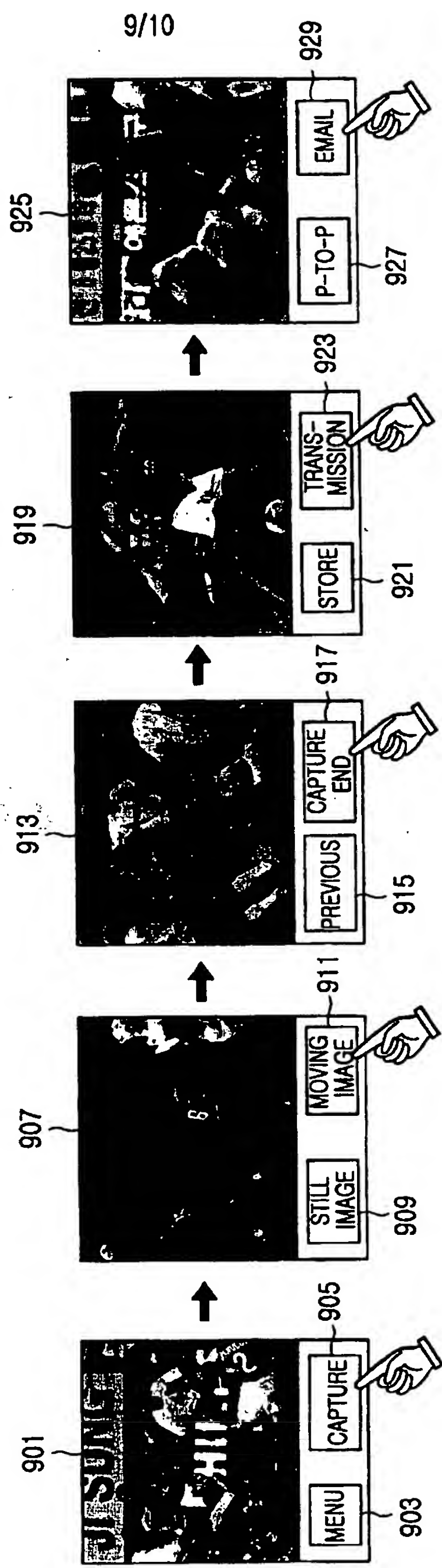


FIG.9

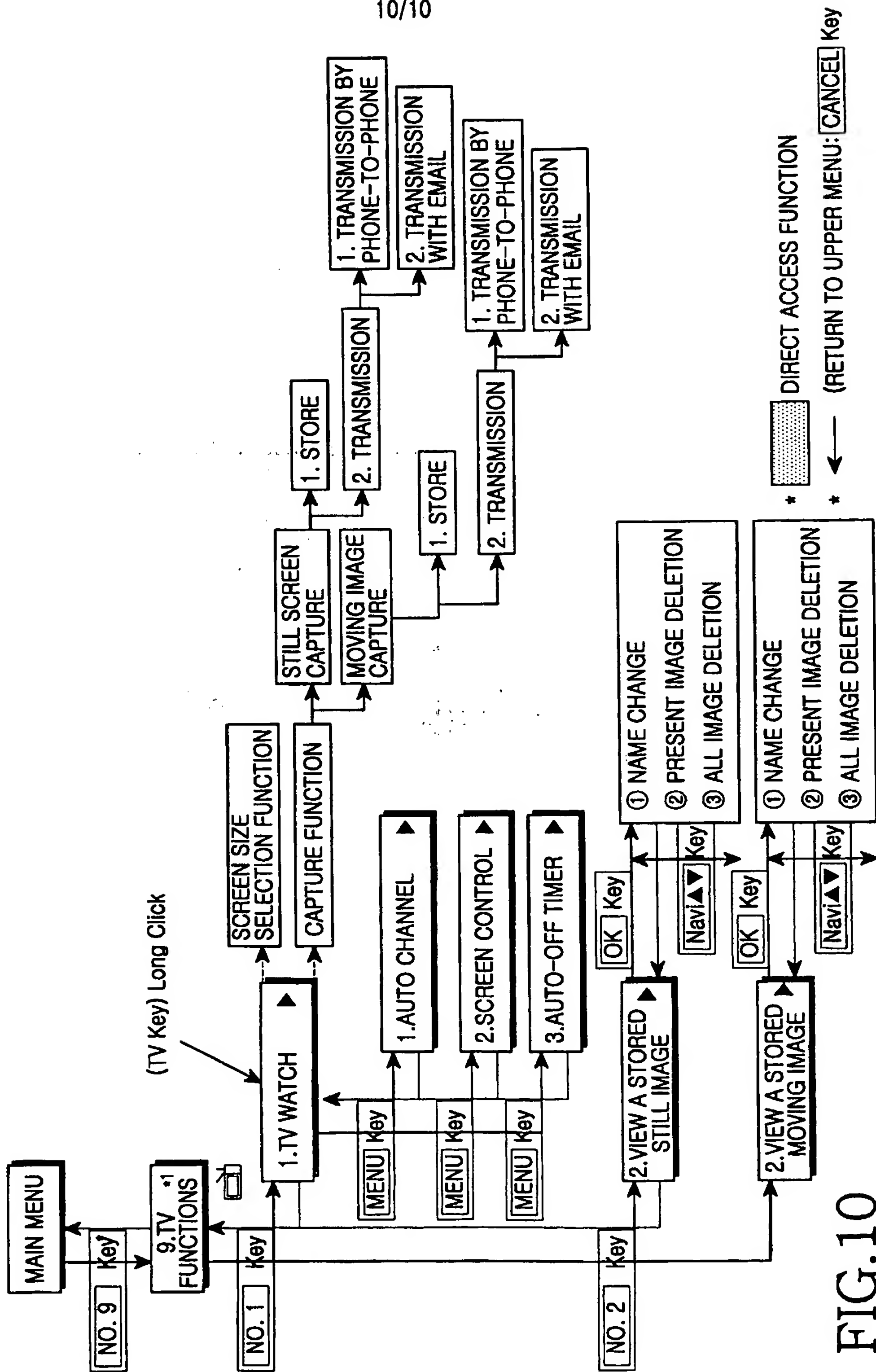


FIG.10